

### SECTION III—REMARKS

This amendment is submitted in response to the Office Action mailed November 25, 2003. In this amendment, claims 39-47 are cancelled and new claims 48-82 are added. Claims 48-82 remain pending in the application. Applicants respectfully request allowance of all pending claims in view of the above amendments and the following remarks.

#### New Matter Objections

The Examiner objected to claim 42 because, according to the Examiner, it introduces new matter into the disclosure. Specifically, the Examiner alleges that claim 42 recites an “active device” that dynamically re-programs each sub-grating, and that the specification fails to teach such an active device. Applicants respectfully submit that the Examiner’s rejection is rendered moot by the cancellation of claim 42.

#### Rejections Under 35 U.S.C. § 112

The Examiner rejected claims 39-47 under 35 U.S.C. § 112, first paragraph for failing to comply with the written description and enablement requirements. The Examiner also rejected the same claims under 35 U.S.C. § 112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Applicants respectfully submit that the Examiner’s rejections under 35 U.S.C. § 112 are rendered moot by the cancellation of these claims.

#### Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 39-41 and 44-47 under 35 U.S.C. § 103(a) as obvious in view of, and therefore unpatentable over, U.S. Patent No. 4,985,624 to Spillman Jr. (“Spillman”). The Examiner also rejected claim 42 under 35 U.S.C. § 103(a) as obvious in view of, and therefore unpatentable over, Spillman in view of U.S. Patent No. 5,832,148 to Yariv (“Yariv”).

As to claims 39-47, Applicants submit that the Examiner’s rejections are rendered moot by the cancellation of these claims. As to new claims 48-82, however, Applicants respectfully traverse the Examiner’s rejections. To establish a *prima facie* case of obviousness, three criteria must be met: (1) the prior art references must teach or suggest all the claim limitations; (2) some suggestion or motivation to combine the references must be found in the prior art; and (3) there

must be a reasonable expectation of success. MPEP § 2143. As explained below, the Examiner has not established a *prima facie* case of obviousness.

New claim 48 recites an apparatus combination including a substrate, a first sub-grating formed on the substrate, the first sub-grating including a pair of lateral edges and having a first grating period and a first amplitude, and “a second sub-grating formed on the substrate parallel to the first sub-grating and separated from the first sub-grating by a selected distance, wherein the second sub-grating has a second grating period different than the first grating period and a second amplitude different than the first amplitude.” Spillman does not disclose, teach or suggest a combination including the recited limitations. Spillman discloses a multi-period grating consisting of gratings having different grating periods, but does not disclose, teach or suggest that the gratings should have different amplitudes. Moreover, Spillman discloses that the gratings should be abutting—that is, that the distance separating the gratings should be zero. Spillman therefore cannot disclose, teach or suggest a combination including “a second sub-grating formed on the substrate parallel to the first sub-grating and separated from the first sub-grating by a selected distance, wherein the second sub-grating has a second grating period different than the first grating period and a second amplitude different than the first amplitude,” and Spillman alone cannot obviate the claim. Yariv similarly does not disclose the recited limitations, meaning that the combination of Spillman and Yariv also cannot obviate the claims. For these reasons, Applicants respectfully submit that new claim 48 is therefore not rendered obvious by Spillman alone, nor by Spillman combined with Yariv. Applicants therefore respectfully request allowance of the claim.

Regarding claims 49-55, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 48 is allowable. Applicants respectfully submit that claims 49-55 are therefore allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request allowance of these claims.

New claim 56 recites an apparatus combination including a substrate, a first sub-grating formed on the substrate, the first sub-grating having a first grating period, and “a second sub-grating formed on the substrate parallel to the first sub-grating and separated from the first sub-

grating by a selected non-zero distance, wherein the second sub-grating has a second grating period different than the first grating period.” Spillman does not disclose, teach or suggest a combination including the recited limitations. Spillman discloses a multi-period grating consisting of gratings having different grating periods, but discloses that the gratings should be abutting—that is, that the distance separating the gratings should be zero. Spillman therefore cannot disclose, teach or suggest a combination including “a second sub-grating formed on the substrate parallel to the first sub-grating and separated from the first sub-grating by a selected non-zero distance, wherein the second sub-grating has a second grating period different than the first grating period,” and Spillman alone cannot obviate the claim. Yariv similarly does not disclose the recited limitations, meaning that the combination of Spillman and Yariv also cannot obviate the claims. For these reasons, Applicants respectfully submit that new claim 56 is therefore not rendered obvious by Spillman alone, nor by Spillman in combination with Yariv. Applicants therefore respectfully request allowance of the claim.

Regarding claims 57-62, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 56 is allowable. Applicants respectfully submit that claims 57-62 are therefore allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request allowance of these claims.

New claim 63 recites a system combination including a first segmented diffraction coupled to the first and second modulators, the segmented diffraction grating comprising a substrate, a first sub-grating formed on the substrate, the first sub-grating having a first grating period, and “a second sub-grating formed on the substrate parallel to the first sub-grating and separated from the first sub-grating by a selected non-zero distance, wherein the second sub-grating has a second grating period different than the first grating period.” By analogy to the discussion above for new claim 56, new claim 63 is not rendered obvious by Spillman alone, nor by Spillman in combination with Yariv. Applicants therefore respectfully request allowance of the claim.

Regarding claims 64-71, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d

1071 (Fed. Cir. 1988). As discussed above, claim 63 is allowable. Applicants respectfully submit that claims 64-71 are therefore allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request allowance of these claims.

New claim 72 recites a process combination including directing first and second optical signals onto a segmented diffraction grating formed on a substrate, the segmented diffraction grating comprising a first sub-grating and a second sub-grating, “diffracting the first optical signal with the first sub-grating, the first sub-grating having a first grating period,” and “diffracting the second optical signal with the second sub-grating, the second sub-grating formed on the substrate parallel to the first sub-grating and separated from the first sub-grating by a selected distance, wherein the second sub-grating has a second grating period different than the first grating period and a second amplitude different than the first amplitude.” By analogy to the discussion above for new claim 48, new claim 72 is not rendered obvious by Spillman alone, nor by Spillman in combination with Yariv. Applicants therefore respectfully request allowance of the claim.

Regarding claims 73-77, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 72 is allowable. Applicants respectfully submit that claims 73-77 are therefore allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

New claim 78 recites a process combination including directing first and second optical signals onto a segmented diffraction grating formed on a substrate, the segmented diffraction grating comprising a first sub-grating and a second sub-grating, “diffracting the first optical signal with the first sub-grating, the first sub-grating having a first grating period,” and “diffracting the second optical signal with the second sub-grating, the second sub-grating formed on the substrate parallel to the first sub-grating and separated from the first sub-grating by a selected non-zero distance, wherein the second sub-grating has a second grating period different than the first grating period.” By analogy to the discussion above for new claim 56, new claim

78 is not rendered obvious by Spillman alone, nor by Spillman in combination with Yariv. Applicants therefore respectfully request allowance of the claim.

Regarding claims 79-82, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 78 is allowable. Applicants respectfully submit that claims 79-82 are therefore allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

#### Double Patenting Rejection

The Examiner rejected claims 39-47 under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 of U.S. Patent No. 6,314,220 to Mossberg *et al* ("Mossberg"). According to the Examiner, although the conflicting claims are not identical they are not patentably distinct from each other because both claim a diffractive structure having a plurality of sub-gratings. Applicants submit that the Examiner's rejection is rendered moot by the cancellation of these claims.

#### Conclusion

Given the above amendments and accompanying remarks, all claims pending in the application are in condition for allowance. If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to allowance of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

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